

REMARKS

The Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and the reasons that follow.

Claims 1-3 and 5-6 are currently pending to be examined on their merits.

The Applicants acknowledge the Office's request for an English translation of the certified priority document (page 2, Office Action) and to perfect the priority claim.

35 U.S.C. § 103 Claim Rejection

Claims 1-3 and 5-6 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Wu (*Catalysts & Catalysis*, 2003, 45(2) 107-110) in view of Abekawa (US 2005/0182264). The Applicants respectfully traverse the rejection.

(i) *Current Obviousness Standard*

The U.S. Supreme Court recently reaffirmed the Graham factors for determining obviousness in *KSR Int'l Co. v. Teleflex Inc.* (No. 04-1350) (U.S., April 30, 2007). The Graham factors, as outlined by the Supreme Court in *Graham et al. v. John Deere Co. of Kansas City et al.*, 383 U.S. 1 (1966), are: 1) determining the scope and contents of the prior art; 2) ascertaining the differences between the claimed invention and the prior art; 3) resolving the level of ordinary skill in the pertinent art; and 4) evaluating evidence of secondary consideration. The Supreme Court recognized that a showing of "teaching, suggestion, or motivation" to combine the prior art to meet the claimed subject matter could provide a helpful insight in determining whether the claimed subject matter is obvious under 35 U.S.C. § 103(a) and held that the proper inquiry for determining obviousness is whether the improvement is more than the predictable use of prior art elements according to their established functions. The Court noted that it is "important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed and specifically stated:

Often, it will be necessary . . . to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was *an apparent reason to combine the known elements in the fashion claimed* by the patent at issue. To facilitate review, this analysis should be made explicit.

KSR Int'l Co. v. Teleflex Inc., slip op. at 14 (emphasis added). As discussed below, the cited art cannot render the claimed invention obvious.

(ii) *The present claims are non-obvious over the teaching of Wu and/or Abekawa*

The Office asserts that motivated by the observation of Wu that Ti-MWW catalyst is excellent when applied to linear alkenes, it would be obvious to a practitioner in the art to apply the catalyst of Wu to the method of Abekawa. Page 3, Office Action. The Applicants respectfully disagree and submit that, on the contrary, one of ordinary skill in the art would not have a reason to combine the teachings of Wu and Abekawa.

The presently claimed method for producing propylene oxide according to present claim 1 recites that hydrogen peroxide is reacted with propylene in the presence of a titanosilicate catalyst having specific X-ray diffraction patterns, wherein the claimed catalyst is **not crystallized** such that the catalyst is produced by a method **not comprising sufficient calcination**. (Exemplary description of the presently claimed method can be found in the present Specification on page 7, lines 11-18).

In contrast, Abekawa discloses a method for producing propylene oxide, which comprises reacting propylene with hydrogen peroxide in the presence of an organic solvent and **crystalline** titanosilicate catalyst. See Abstract and/or Brief Summary of the Invention, Abekawa. The crystalline catalyst of Abekawa is distinct from the presently claimed catalyst, which is not crystallized, as described above.

Wu also teaches a method that is different from the presently claimed methods. Wu describes two kinds of Ti-MWW catalysts – “calcined Ti-MWW” and “merely dried Ti-MWW.”

As compared with the “calcined Ti-MWW” (prepared at high temperature (823 K)), Wu discloses that the “merely dried Ti-MWW” catalyst shows higher catalytic activity for epoxidation of cyclic alkenes and becomes an efficient catalyst for reaction of **bulky substrates** (page 1, lines 9-13). Additionally, Wu, on page 7, lines 4-7 discloses that the “merely dried Ti-MWW” catalyst shows higher conversion efficiency to cyclopentene, a **bulky** substrate, **but it shows lower activity** than “calcined Ti-MWW” on 1-hexene, **a chain substrate** (Wu discloses only cyclopentene and 1-hexene as substrates for the catalysts).

By contrast, Abekawa teaches that the substrate is propylene, which is a **short-chain** alkene. Thus, one of ordinary skill in the art would not have a reason combine Wu’s teaching, which focuses only on **bulky** substrate, with Abekawa, which focuses on a **chain** substrate. Additionally, neither Wu nor Abekawa teaches or suggests a method that comprises reacting propylene with hydrogen peroxide in the presence of a **not-crystallized** catalyst. Abekawa only discloses the method using **crystalline** titanosilicate catalyst, and Wu only discloses that the merely dried Ti-MWW catalyst is an efficient catalyst for reaction of **bulky substrates**. In consequence, one of ordinary skill in the art would not have a reason to combine the teaching of Wu with that of Abekawa. *See KSR Inc.*

Therefore, the teachings of Wu and Abekawa, alone or in combination, do not render the present claims obvious.

(ii) Unexpected desirable results from the present claimed methods

Not only would one of ordinary skill in the art not have a reason to combine the teachings of Wu and Abekawa, the presently claimed methods show unexpected results indicative of nonobviousness.

With an uncrystallized catalyst for the reaction of propylene and a short-chain alkene, the presently claimed methods can produce propylene oxide with great efficiency that is equal to or higher than the process using a crystallized catalyst. As demonstrated in Examples 1 and 2 in the

present application, the catalyst as recited in the present claims, wherein the catalyst was prepared by drying at 170 °C, the propylene oxide production activities per unit catalyst were 0.781 mol/(h·g) and 0.319 mol/(h·g), respectively. By contrast, when the catalyst is different from what is presently claimed, as shown in Comparative Examples 1 and 2 (conducted with the same process as Examples 1 and 2, respectively, except with a different catalyst), wherein the catalyst was prepared by firing the catalyst of the examples at 530 °C for 6 hours, the production activities were only 0.309 mol/(h·g) and 0.300 mol/(h·g), respectively, lower than the activities resulting from using the presently claimed catalyst.

Therefore, the methods as recited in the present claims are not obvious over the teachings of Wu and Abekawa. At least in view of the foregoing, the Applicants respectfully request that the rejection be withdrawn.

CONCLUSION

The Applicants believe that the present application is now in condition for allowance and thus respectfully request favorable reconsideration of the application.

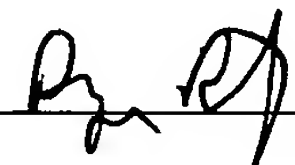
The Office is invited to contact the undersigned by telephone if a telephone interview would advance the prosecution of the present application.

The Office is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, the Applicants hereby petition for such extension under 37 C.F.R. § 1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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